



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/295,607	04/22/1999	SHUNPEI YAMAZAKI	740756-1961	7371
22204 7590 08/29/2008 NIXON PEABODY, LLP 401 9TH STREET, NW SUITE 900 WASHINGTON, DC 20004-2128				
EXAMINER				
HU, SHOUXIANG				
ART UNIT		PAPER NUMBER		
2811				
MAIL DATE		DELIVERY MODE		
08/29/2008		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

Application No.

09/295,607

Applicant(s)

YAMAZAKI ET AL.

Examiner

Shouxiang Hu

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 13 June 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 8, 17, 24, 30, 47, 53, 54, 60-63 and 68-87 is/are pending in the application.
- 4a) Of the above claim(s) 8, 17, 24, 30, 47, 53, 54 and 68-87 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 60-63 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☒ Certified copies of the priority documents have been received in Application No. 08/085,931.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-550a)  
Paper No(s)/Mail Date 10/31/2007; 04/22/2008
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Election/Restrictions*

1. Claims 54, 71-76 and 80-87 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on June 13, 2008.
2. In addition, claims 8, 17, 24, 30, 47, 53, 68-70 and 77-79 are also withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being unreadable on the elected species, as they as are not necessarily involve an insulating film formed of aluminum nitride and oxygen on the front side, as required in the elected Species 3.
3. Therefore, claims 8, 17, 24, 30, 47, 53-54, 60-63 and 68-87 are pending in this application; and, claims 60-63 remain active in this office action.

And, applicant is reassured that, upon the allowance of any of the elected claim(s) readable on the elected species, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of the allowed claim(s).

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 60-63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ikeda (Ikeda et al., JP 59-121876; of record) in view of Kim (Kim et al., US 5,270,263), and further in view of Takasu (Takasu et al., US 5,637,187) and/or JP'419 (JP 62-181419; of record) and/or Troxell (Troxell et al., US 4,851,363), and further in view of Wakai (Wakai et al., US 5,032,883).

Ikeda discloses a semiconductor device (similar to Figs. 1a-1c; also see its English translation, especially see the second paragraph on page 4 in the translation), comprising:

- a substrate (11; glass) having a front surface and a rear surface;

- a second insulating film formed of an aluminum nitride insulating film (12, which can be formed of AlN, see the second paragraph on page 4 in the translation) provided on the front surface of the substrate; and

- a transistor provided over the front surface of the substrate, the transistor having at least a channel formation region comprising silicon (similar to 15a and/or 15b; it can be a crystalline silicon as it can be formed of polysilicon, see the second paragraph on page 4 in the translation), a gate insulating film (14) adjacent to the channel formation region, and a gate electrode (13a and/or 13b) adjacent to the channel formation region with the gate insulating film interposed therebetween.

Ikeda further teaches that the aluminum nitride insulating film can be formed through sputtering.

Ikeda does not expressly disclose sufficient details about the sputtering process for forming the aluminum nitride insulating film, and/or that such insulating film through sputtering includes oxygen.

However, as evidenced in Kim (see the abstract, col. 1, lines 25-35, col. 3, lines 3-10, and col. 5, lines 38-39; also see Fig. 5), one of ordinary skill in the art would readily recognize that an aluminum nitride insulating film can be commonly and desirably formed through sputtering with a nitrogen gas being used as both the reactive gas and the sputtering gas for achieving desired high quality for the insulating film; and, the aluminum nitride insulating film formed through such sputtering process naturally contains (more or less) certain oxygen (see col. 5, lines 38-39; also see the naturally existing O in Fig. 5), as O is one of the nature's most abundant elements and it is normally impractical to completely remove it from such a sputtering system.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the semiconductor device of Ikeda with the aluminum nitride insulating film be formed through a nitrogen gas-based sputtering method, per the teachings of Kim, so that a semiconductor device with desired high quality in the aluminum nitride insulating film therein would be obtained. And, with the aluminum nitride insulating film being formed through the nitrogen gas-based sputtering method of Kim, the aluminum nitride insulating film in the semiconductor device collectively taught above by Ikeda and Kim would inherently and/or naturally include certain oxygen therein.

Neither of Ikeda and Kim expressly discloses that the device can further include a first and third oxide insulating films and/or an interlayer insulating film underlying a pixel electrode. However, one of ordinary skill in the art would readily recognize that such first and third oxide insulating films can be desirably formed for providing desired interfacing effects to the underlying glass substrate and/or to the overlying device layer, including passivating and/or adhesion and/or stress buffer and/or diffusion barrier and/or interface control, as readily evidenced in Takasu (see the first and third oxide insulating films 22 and 61 in Fig. 6), and/or in JP'419 (see the first oxide insulating film 12 in Fig. 1), and/or in Troxell (see the third oxide insulating film 16 in the cover page figure). And, one of ordinary skill in the art would also readily recognize that such an interlayer insulating film can be commonly and desirably formed so as to form a desired flat pixel electrode thereon, as readily evidenced in Wakai (see the interlayer insulating film 108 and the overlying pixel electrode 110 in the cover page figure).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the semiconductor device collectively taught above by Ikeda and Kim, and further inserting a first oxide insulating film between the second insulating film and the underlying substrate and inserting a third oxide insulating film between the second insulating film and the overlying device layer, per the teachings of Takasu, JP'419 and/or Troxell, so that a thin film device with desired interfacing effects to the underlying glass substrate and/or to the overlying device layer therein would be achieved. And, it would also have been obvious to one of ordinary skill in the art at the time the invention was made to further incorporate a leveled interlayer and

pixel electrode such as that of Wakai into the device collectively taught above, so that a thin-film-based display device with a desired flat pixel electrode therein would be obtained.

### ***Response to Arguments***

4. Applicant's arguments with respect to the claims rejected above have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shouxiang Hu whose telephone number is 571-272-1654. The examiner can normally be reached on Monday through Friday, 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynne Gurley can be reached on 571-272-1670. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Shouxiang Hu/  
Primary Examiner, Art Unit 2811